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(54) Process for doping crystals of wide band gap semiconductors.

(57) Non-equilibrium impurity incorporation is used to dope hard-to-dope crystals of wide band gap semiconductors, such as zinc selenide and zinc telluride. This involves incorporating into the crystal a compensating pair of primary and secondary dopants, thereby to increase the solubility of either dopant alone in the crystal. Thereafter, the secondary more mobile dopant is removed preferentially, leaving the primary dopant predominant. This technique is used to dope zinc selenide p-type by the use of nitrogen as the primary dopant and lithium as the secondary dopant. Alternatively, the technique may use nitrogen as the primary dopant and the hydrogen as the secondary dopant to obtain low resistivity p-type zinc selenide.

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EUROPEAN SEARCH REPORT

Application Number

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. CL 5)
A	SEMICONDUCTOR SCIENCE & TECHNOLOGY, vol. 2, no. 10, October 1987, pages 629-635, IOP Publishing Ltd, Bristol, GB; F. EL. AKKAD: "Lithium and phosphorus impurities in ZnTe" * Page 632, right-hand column, paragraphs 3-4 * ---	1,4,5,7	H 01 L 21/38 H 01 L 21/477 H 01 L 33/00
A	JOURNAL OF APPLIED PHYSICS, vol. 42, no. 7, June 1971, pages 2919-2924; B. TELL: "Properties of the alkalis in CdS" * Page 2922, right-hand column, last paragraph - page 2923, left-hand column, paragraph 1 * ---	1	
A	JOURNAL OF ELECTRONIC MATERIAL, vol. 5, no. 1, February 1976, pages 23-35, Plenum Publishing Corp., New York, US; Z.K. KUN et al.: "Some characteristics of the formation of high conductivity p-layers in ZnSe and ZnSxSe1-x" * Abstract; page 34, paragraph 3 * ---	1,7	TECHNICAL FIELDS SEARCHED (Int. CL 5) H 01 L
A	PATENT ABSTRACTS OF JAPAN, vol. 12, no. 423 (E-680), 9th November 1988; & JP-A-63 160 344 (TOSHIBA CORP.) 04-07-1988 * Abstract * ---	1,7	
A	APPLIED PHYSICS LETTERS, vol. 52, no. 1, 4th January 1988, pages 57-59, American Institute of Physics; T. YASUDA et al.: "Metalorganic vapor phase epitaxy of low-resistivity p-type ZnSe" * Abstract * ---	1,8,7	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 02-02-1990	Examiner GORI P.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosures P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date O : document cited in the application L : document cited for other reasons Δ : member of the same patent family, corresponding document	

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EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
P, X	FR-A-2 613 136 (INCUBATOR & MISAWA) * Page 8, line 14 - page 10, line 1 * -----	1, 2	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
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<p>CATEGORY OF CITED DOCUMENTS</p> <p>X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document</p> <p>T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons</p> <p>&: member of the same patent family, corresponding document</p>			

